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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/775,911	02/10/2004	Dennis R. Morgan	13	1216

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EXAMINER	
LEE, DAVID J	
ART UNIT	**PAPER NUMBER**
2613	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/18/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/775,911	MORGAN, DENNIS R.	
	Examiner	Art Unit	
	David Lee	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 February 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,7-11,13-22* is/are rejected.

7)☒ Claim(s) *6,12* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-5 and 13-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Madsen ("Optical All-pass Filters for Polarization Mode Dispersion Compensation", Optics Letters. Vol. 25, No. 12. June 15, 2000) in view of Bessios (US Patent No. 7,110,683).

Regarding claims 1 and 13, Madsen teaches a method for compensating for polarization mode dispersion in an optical fiber communication system (see Abstract), comprising the steps of: reducing said polarization mode dispersion using a cascade of all-pass filters (see fig. 1) and adjusting coefficients of said all-pass filters (see, e.g., 3rd full paragraph of col. 1 on pg. 879). Madsen does not expressly disclose that the coefficients are adjusted using a least mean square algorithm, but he does disclose that adaptive and tunable filters are used (see first full paragraph of col. 1 on pg. 879). A skilled artisan would have readily recognized that filters, such as the ones disclosed by Madsen, usually require an algorithm to determine proper coefficients for the filtering mechanism. Furthermore, it is well known in the art that a least mean square algorithm can be advantageously used in adaptive FIR filters for optimizing system coefficients. For example, Bessios, from a similar field of endeavor, teaches a method for compensating for polarization mode dispersion in an optical fiber communication system (see Title and Abstract) comprising, inter alia, the step of adjusting coefficients of adaptive FIR filters using a least mean

square algorithm (see fig. 4; see also col. 4, lines 52-63 and col. 5, lines 40-51). It would have been obvious to a skilled artisan at the time of invention to use an LMS algorithm, as taught by Bessios, to adjust the coefficients of the filters of Madsen in order to calculate and optimize the coefficients associated with the filters so as to effectively compensate for polarization mode dispersion.

Regarding claims 2 and 14, Madsen teaches a two-channel structure consisting of multiple cascades of all-pass filters and directional couplers (see fig. 1: note APF1 and APF2 and the tunable couplers as illustrated in fig. 1b).

Regarding claims 3 and 15, the combined invention of Madsen and Bessios teaches that the coefficient values are adjusted to minimize a cost function (the cost function is understood as the transfer matrix of eq. 3 of Madsen; see also Table 1 in col. 5 of Bessios).

Regarding claims 4 and 16, Madsen teaches the step of measuring said polarization mode dispersion in a received optical signal (see Abstract).

Regarding claims 5 and 17, Madsen teaches that the measuring step employs a tunable narrowband optical filter to render information from energy detector measurements (see last sentence of first full paragraph of col. 1 on pg. 879).

3. Claims 7-11 and 18-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Madsen in view of Wang et al. (US Pub. No. 2005/0008070 A1).

Regarding claims 7 and 18, Madsen teaches a method for compensating for polarization mode dispersion in an optical fiber communication system (see Abstract), comprising the steps of: reducing said polarization mode dispersion using a cascade of all-pass filters (see fig. 1) and

adjusting coefficients of said all-pass filters (see, e.g., 3rd full paragraph of col. 1 on pg. 879). Madsen does not expressly disclose that the coefficients are adjusted using a Newton algorithm, but he does disclose that adaptive and tunable filters are used (see first full paragraph of col. 1 on pg. 879). A skilled artisan would have readily recognized that filters, such as the ones disclosed by Madsen, usually require an algorithm to determine proper coefficients for the filtering mechanism. Furthermore, it is well known in the art that a Newton algorithm can be advantageously used in adaptive FIR filters for optimizing system coefficients. For example, Wang, from a similar field of endeavor, teaches a method for compensating for polarization mode dispersion in an optical fiber communication system (see, e.g., second half of paragraph 0071) comprising, inter alia, the step of adjusting coefficients of adaptive filters using a Newton algorithm (see, e.g., paragraphs 0052 and 0074). It would have been obvious to a skilled artisan at the time of invention to use an Newton algorithm, as taught by Wang, to adjust the coefficients of the filters of Madsen in order to calculate and optimize the coefficients associated with the filters so as to effectively compensate for polarization mode dispersion. It is parenthetically noted that Wang further teaches that an LMS algorithm could also be used to calculate the coefficients (see paragraph 0074: an LMS algorithm is a "steepest descent" algorithm).

Regarding claims 8 and 19, Madsen teaches a two-channel structure consisting of multiple cascades of all-pass filters and directional couplers (see fig. 1: note APF1 and APF2 and the tunable couplers as illustrated in fig. 1b).

Regarding claims 9 and 20, the combined invention of Madsen and Wang teaches that the coefficient values are adjusted to minimize a cost function (the cost function is understood as the transfer matrix of eq. 3 of Madsen; see also paragraph 0074 of Wang).

Regarding claims 10 and 21, Madsen teaches the step of measuring said polarization mode dispersion in a received optical signal (see Abstract).

Regarding claims 11 and 22, Madsen teaches that the measuring step employs a tunable narrowband optical filter to render information from energy detector measurements (see last sentence of first full paragraph of col. 1 on pg. 879).

Allowable Subject Matter

4. Claims 6 and 12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

5. Applicant's arguments filed on 2/7/2007 have been fully considered but they are not persuasive.

While Applicant does acknowledge that the use of LMS algorithms in adaptive FIR filters in the art, Applicant argues that "the adaptation equations for FIR filters do not apply to the adaptation of an all-pass filter" (third paragraph, pg. 7 of Applicant's Remarks) and that "for most applications, an all-pass filter is not advantageous and an FIR filter is much easier to implement" (fourth paragraph, pg. 7 of Applicant's Remarks). First it is noted that the arguments or conclusions of the attorney cannot take the place of evidence. See In re Cole, 51 CCPA 919,326 F.2d 769, 140 USPQ 230 (1964); In re Schulze, 52 CCPA 1422, 346 F.2d 600, 145 USPQ 716 (1965); Meitzner v. Mindick, 549 F.2d 775, 193 USPQ 17 (CCPA 1977).

Second, it is parenthetically noted that LMS and Newton algorithms are merely techniques of calculating coefficients for an equation. Lastly, Examiner submits that the combination is readily feasible. Madsen discloses a method for compensating for polarization mode dispersion comprising the steps of reducing PMD using a cascade of APF filters and adjusting coefficients of said filters and Bessios discloses the technique of using LMS algorithms for adjusting coefficients of filters. Examiner has established a prima facie case of obviousness and it is submitted that the combination is readily feasible.

Accordingly, Examiner's recited combination of Madsen and Bessios meet each of the requirements for a prima facie case for obviousness and the claims still stand rejected under 35 U.S.C. 103(a) as being unpatentable over Madsen in view of Bessios.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Lee whose telephone number is (571) 272-2220. The examiner can normally be reached on Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

David Lee
Patent Examiner

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